CLAIMS

What is claimed is:

1. For use with a subject vehicle having both brakes and brake lights, a method of activating the brake lights of the subject vehicle comprising:

first sensing any application of the brakes of the subject vehicle;

second sensing any presence of brake light emissions of another vehicle to the forward of the subject vehicle; and

activating the brake lights of the subject vehicle during the persistence of either an application of the brakes of the subject vehicle as is determined by the first sensing, or during brake light emissions of another vehicle as is determined by the second sensing.

2. The method of activating the brake lights of the subject vehicle according to claim 1 wherein the second sensing comprises:

imaging with a color camera a multi-color image to the forward of the subject vehicle;

storing in a memory the multi-color image; and

interpreting with a microprocessor a current multicolored image resulting from the imaging with a historical multicolored image resulting from the storing in order to recognize changes in the image indicative of the activation of one or more brake lights to the forward of the subject vehicle.

3. The method of activating the brake lights of the subject vehicle according to claim 2

wherein the interpreting with the microprocessor, and the comparison of the current image with the stored image, serves to detect any significant incipient increase in a red color, accompanied by only insignificant changes in green and in blue colors, of pixels that are (i) of proper individual areas (ii) at

a proper two locations (iii) properly spaced apart in separation and (iv) properly in a substantially horizontal direction so as to reasonably represent light emission from an activated pair of brake lights to the forward of the subject vehicle, to so be an activation of a pair of brake lights to the forward of the subject vehicle.

4. The method of activating the brake lights of the subject vehicle according to claim 3

wherein the interpreting with the microprocessor is of further of angles that the red color pixels occupy relative to the subject vehicle, thus to further decide whether detected brake lights are in lane to the forward of the subject vehicle or are not in lane but are instead to either side of the subject vehicle.

5. The method of activating the brake lights of the subject vehicle according to claim 2

wherein the interpreting with the microprocessor, and the comparison of the current image with the stored image, transpires by a point accumulation process with positive points, meaning that one or more brake lights is deemed to likely have been detected when sufficient points are accumulated from assessment of at least two of the following factors

(1) a significant incipient increase in a red color, accompanied by only insignificant changes in green and in blue colors,

(2) one or more individual areas of detected illumination increase as are appropriately sized to be an actual image of one or more real brake lights,

(3) one or more individual areas of detected illumination increase as are appropriately located to be an actual image of one or more real brake lights,

(4) two individual areas of detected illumination occurring at the same time as would be an actual image of a real pair of brake

lights,

(5) two individual areas of detected illumination increase as are appropriately spaced apart in separation to be an actual image of a real pair of brake lights,

(6) two individual areas of detected illumination increase as are appropriately spaced apart in a substantially horizontal direction so as to be an actual image of a real pair of brake lights, and

(7) two individual areas of detected illumination as are approximately of equal intensity as would be an actual image of a real pair of brake lights.

6. The method of activating the brake lights of the subject vehicle according to claim 5

wherein the point accumulation process is further in consideration of the following factor:

(8) an angle or angles at which one or more areas of illumination increase are detected as would be appropriate to a location or locations of illumination increase on an actual image of one or more real brake lights to the forward of the subject vehicle.

7. The method of activating the brake lights of the subject vehicle according to claim 1 further comprising:

alerting a driver of the subject vehicle upon brake light emissions of another vehicle as is determined by the second sensing.

8. The method of activating the brake lights of the subject vehicle according to claim 1 further comprising:

wherein the activating of the brake lights of the subject vehicle during the persistence of brake light emissions of another vehicle as is determined by the second sensing commences after a predetermined time delay from initially so second sensing the brake

light emissions of another vehicle.

9. A system for activating the brake lights and/or brakes of a subject vehicle comprising:

a first sensor producing a first signal upon any application of the brakes of the subject vehicle;

a second sensor producing a second signal upon any presence of brake light emissions of another vehicle to the forward of the subject vehicle; and

an activator of the brake lights and/or brakes of the subject vehicle during the persistence of either the first signal or the second signal.

10. The system according to claim 9 wherein the second sensor comprises:

a color camera imaging a multi-color image to the forward of the subject vehicle;

a memory storing the multi-color image; and

a microprocessor interpreting a current multicolored image resulting from the imaging with a historical multicolored image resulting from the storing in order to recognize the activation of one or more brake lights to the forward of the subject vehicle.

11. The system according to claim 10 wherein the color camera comprises:

a CCD.

12. The system according to claim 10 wherein the color camera comprises:

two spaced apart CCDs;

wherein differing angles to each CCD of a red light to the forward of the subject vehicle is indicative of the distance of the red light.

13. The system according to claim 9 wherein the second sensor comprises:

a red light optical signal sensor producing a red light signal responsive to intensity of red light to the forward of the subject vehicle;

an ambient light sensor producing an ambient light signal response to intensity of ambient light to the forward of the subject vehicle; and

a threshold difference detector, receiving the red light signal and the ambient light signal, for producing the second signal upon, and for the duration of, such times as a magnitude of the red light signal is greater than a predetermined ratio to a magnitude of the ambient light signal.

14. The system according to claim 13

wherein the predetermined ratio of the threshold difference detector is adjustable.

15. The system according to claim 9

wherein the second sensor is producing a pulsed second signal; and

wherein upon such times as only the pulsed second signal is being produced, the activator produces flashing brake lights in the subject vehicle.

16. The system according to claim 15 further comprising:

a means for setting the rate at which the pulsed second signal is produced.

17. The system according to claim 16 wherein the means for setting the rate comprises:

a proximity sensor for sensing an obstacle including another vehicle including a vehicle producing the brake light emissions to the forward of the subject vehicle; and

a rate-adjusting means responsive to the proximity sensor for setting a higher rate when the proximity sensor indicates an obstacle relatively closer to the forward and a lower rate when the proximity sensor indicates an obstacle relatively further to the forward.

18. The system according to claim 9

wherein coaction between the activator of the brake lights and/or brakes of the subject vehicle during the persistence of the second signal, and the second sensor producing a second signal upon any presence of brake light emissions of another vehicle to the forward of the subject vehicle, makes that activating of the brake lights and/or brakes of the subject vehicle occurs only after a predetermined delay, it being of no consequence whether this predetermined delay is considered to be in the production of the second signal by the second sensor, or in the activator responsively to this second signal, or in both the second sensor and the activator.

19. The system according to claim 9 further comprising:

an alarm, responsive to the second signal, for alerting a driver of the subject vehicle to any presence of brake light emissions of another vehicle to the forward of the subject vehicle.

20. A system for propagating brake lights between vehicles upon a highway comprising:

a sensor in a vehicle for sensing any application of brake lights to the forward of the vehicle; and

an activator of the brake lights of the vehicle responsive to the sensed application of brake lights to the forward;

wherein brake lights are propagated from the forward of the vehicle to the rearward of the same vehicle.

21. The system according to claim 20

wherein the sensor and the activator are present in each of an unbroken succession of vehicles;

22. The system according to claim 20 wherein the sensor comprises:

a color camera imaging a multi-color image to the forward of the vehicle;

a memory storing the multi-color image; and

a microprocessor interpreting a current multicolored image resulting from the imaging with a historical multicolored image resulting from the storing in order to recognize the activation of one or more brake lights to the forward of the vehicle.

23. The system according to claim 22 wherein the color camera comprises:

one or more CCDs.

Document: 2004-0000